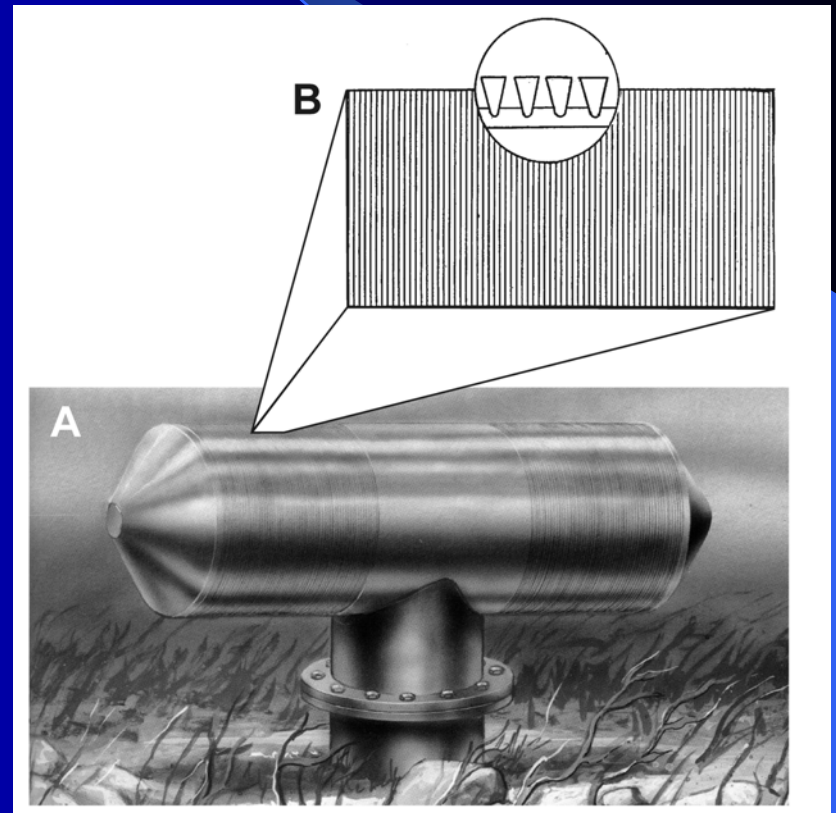


Optimal Slot-Width Selection for Wedge Wire Screens

*William Dey, John Young, Steven Jinks,
Nancy Decker, Jon Black, and Stephen Amaral*

Factors Affecting Screen Performance

- Slot width
- Through-slot velocity
- Sweep velocity



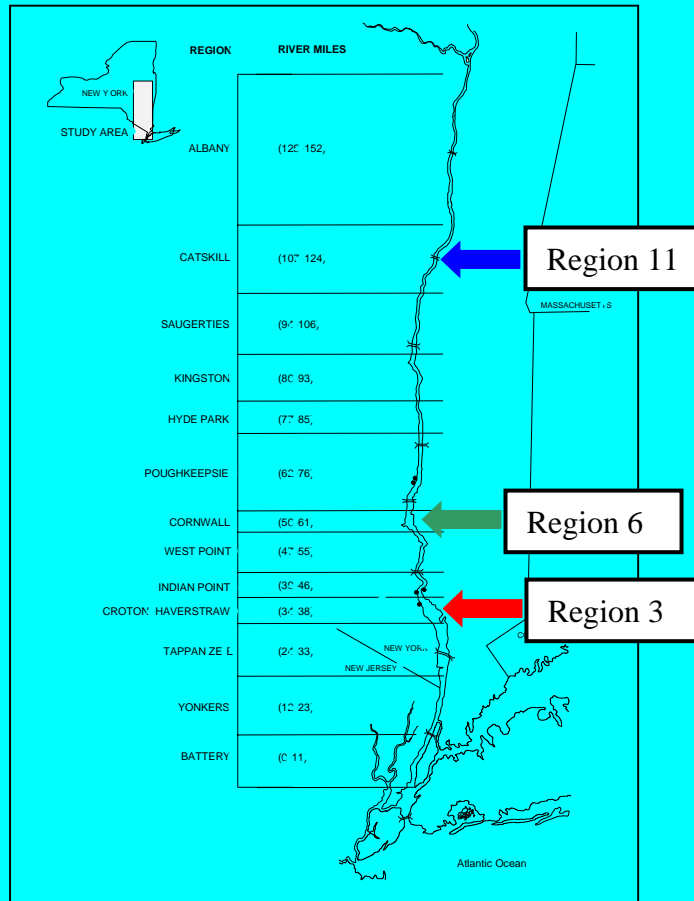
Purpose of Study

- To evaluate effects of slot width on screen performance at three hypothetical power plant locations on Hudson River estuary
- Address different response across three species:
 - American shad
 - Striped bass
 - Bay anchovy
- Performance measured in terms of equivalent Age 1 individuals

Hypothetical Plant

- 500 MGD cooling water requirement
- Base loaded
- Offshore intake with 0.5 mm, 1.0 mm, 2.0 mm, or 3.0 mm slot width wedge wire screens
- 0.25 fps through-slot velocity
- Three potential locations
 - Mesohaline
 - Lower Tidal Freshwater
 - Upper Tidal Freshwater

Hudson River Estuary



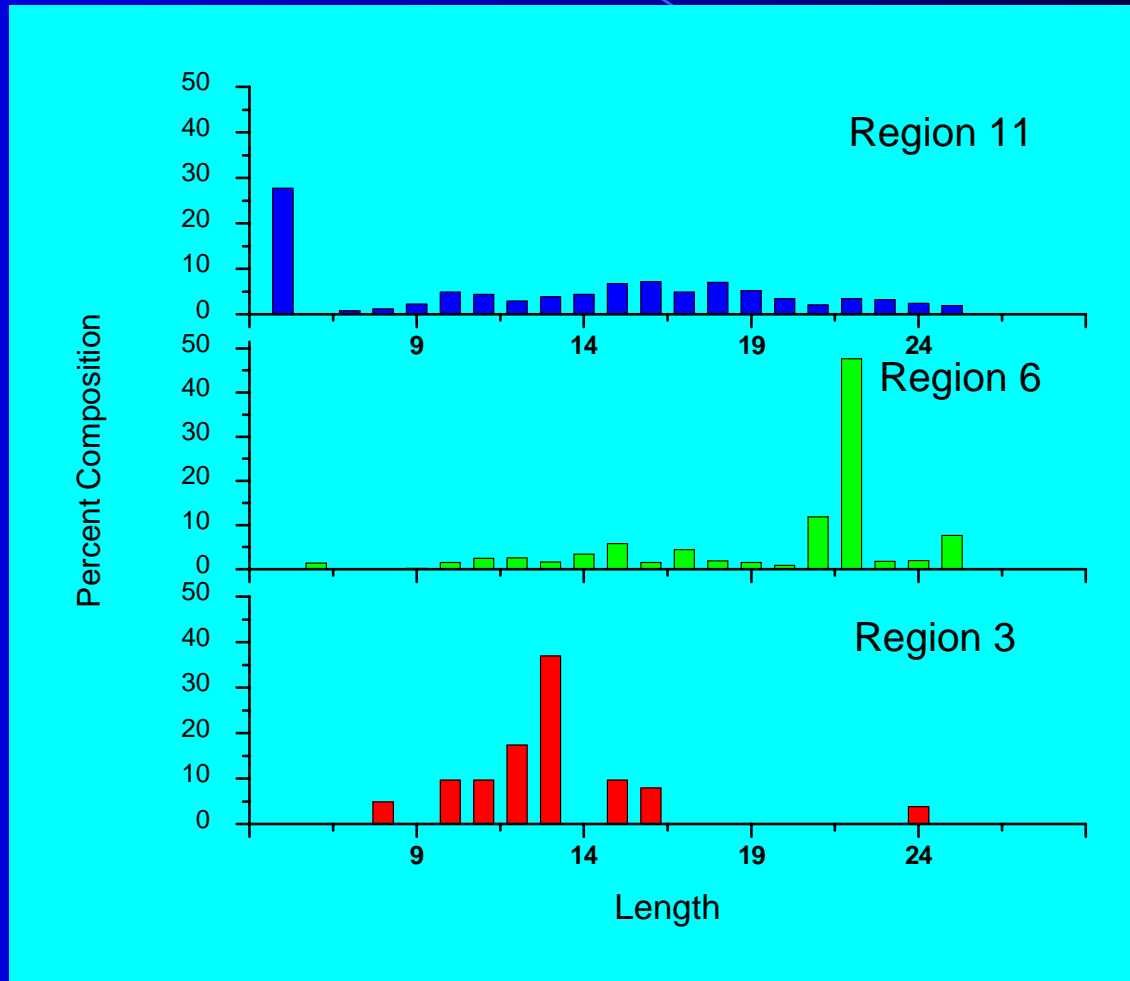
American
Shad

Striped
Bass

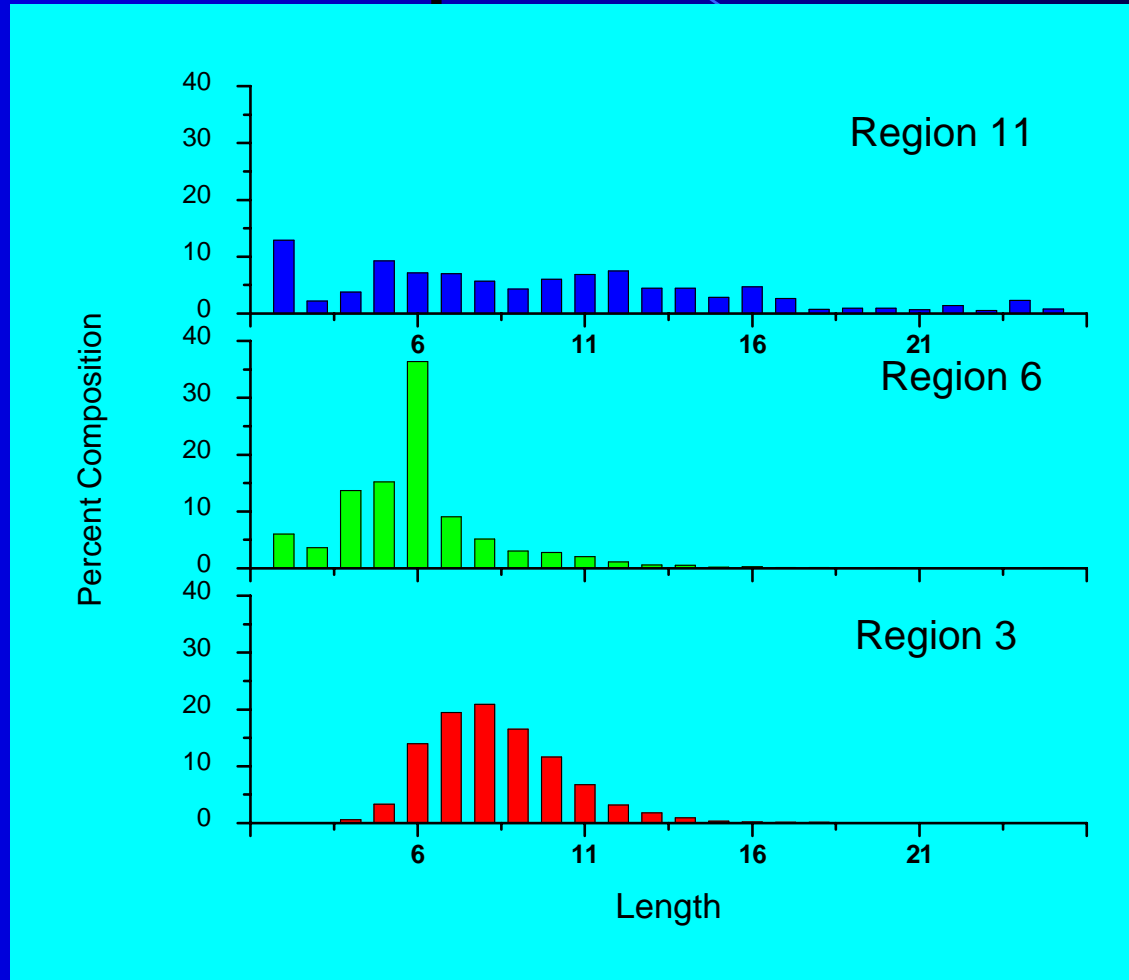
Bay
Anchovy

ASA analysis & communication

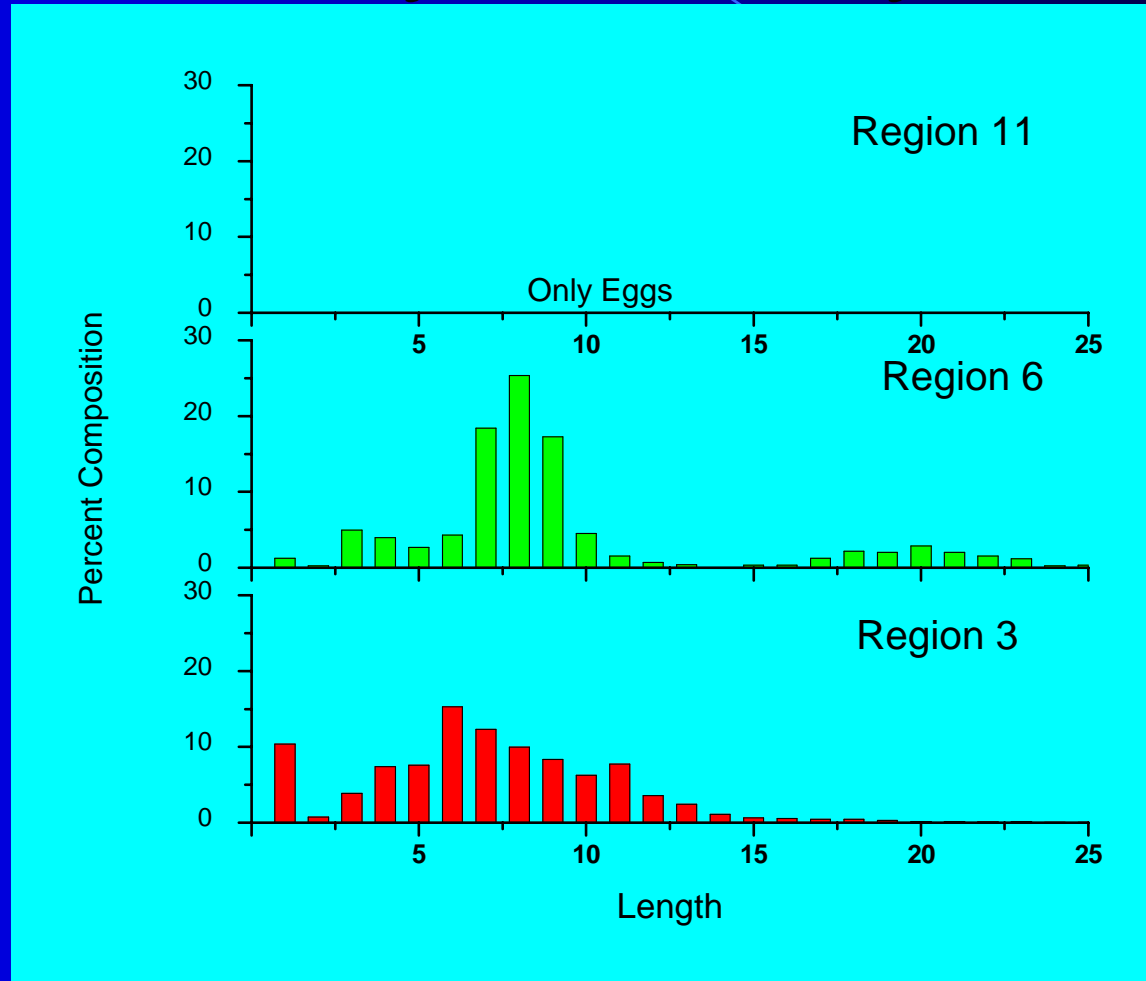
Length Distribution American Shad



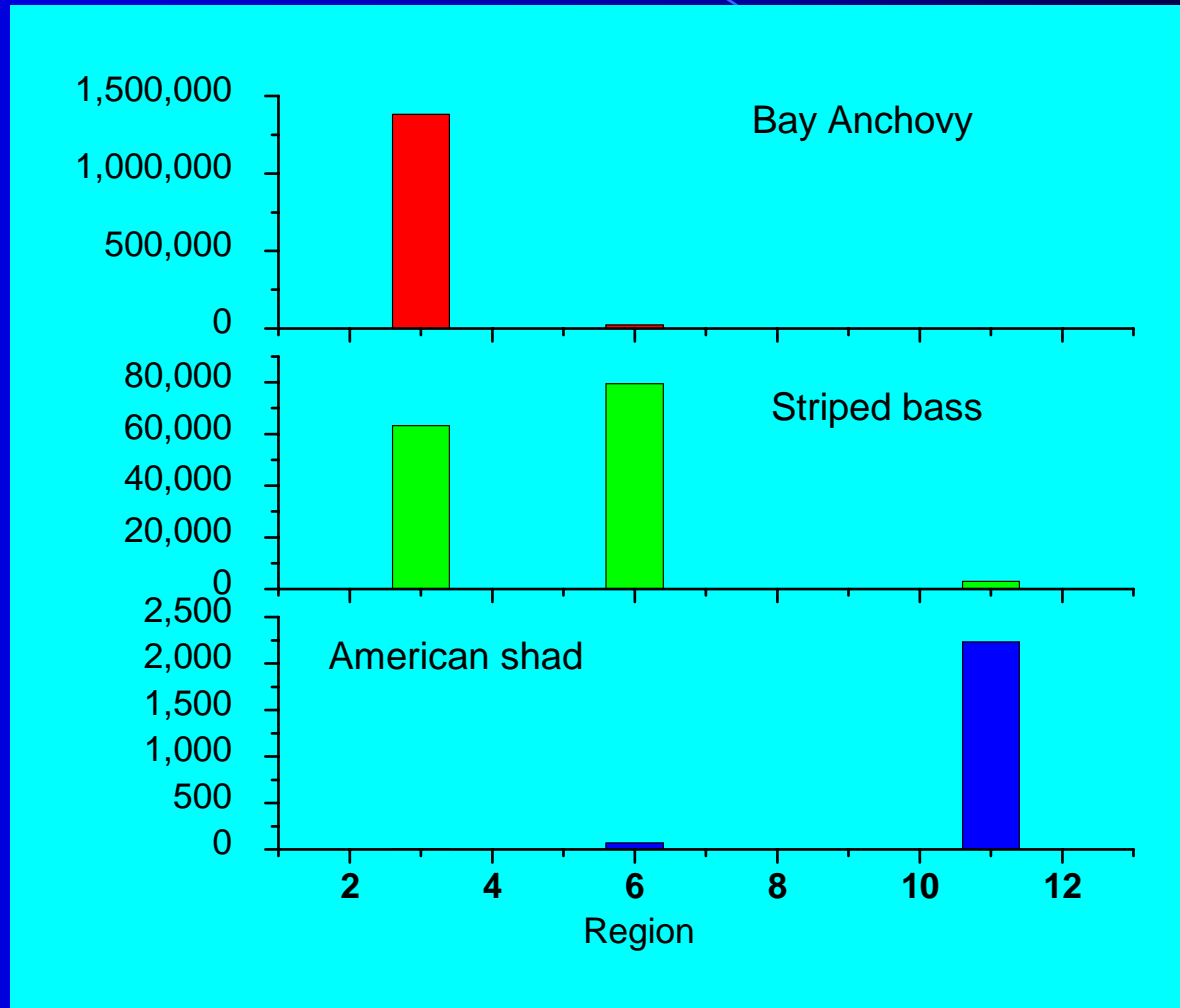
Length Distribution Striped Bass



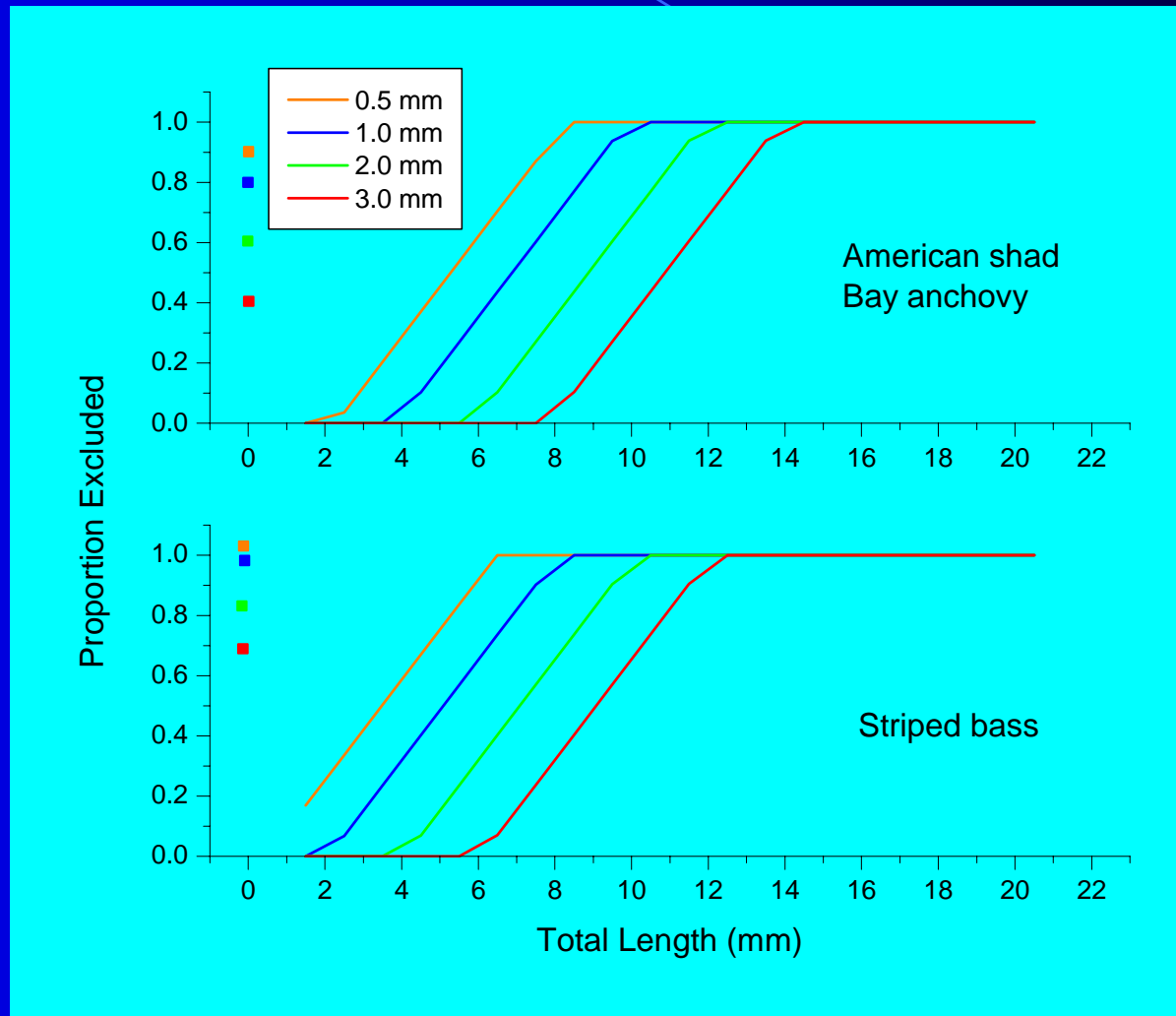
Length Distribution Bay Anchovy



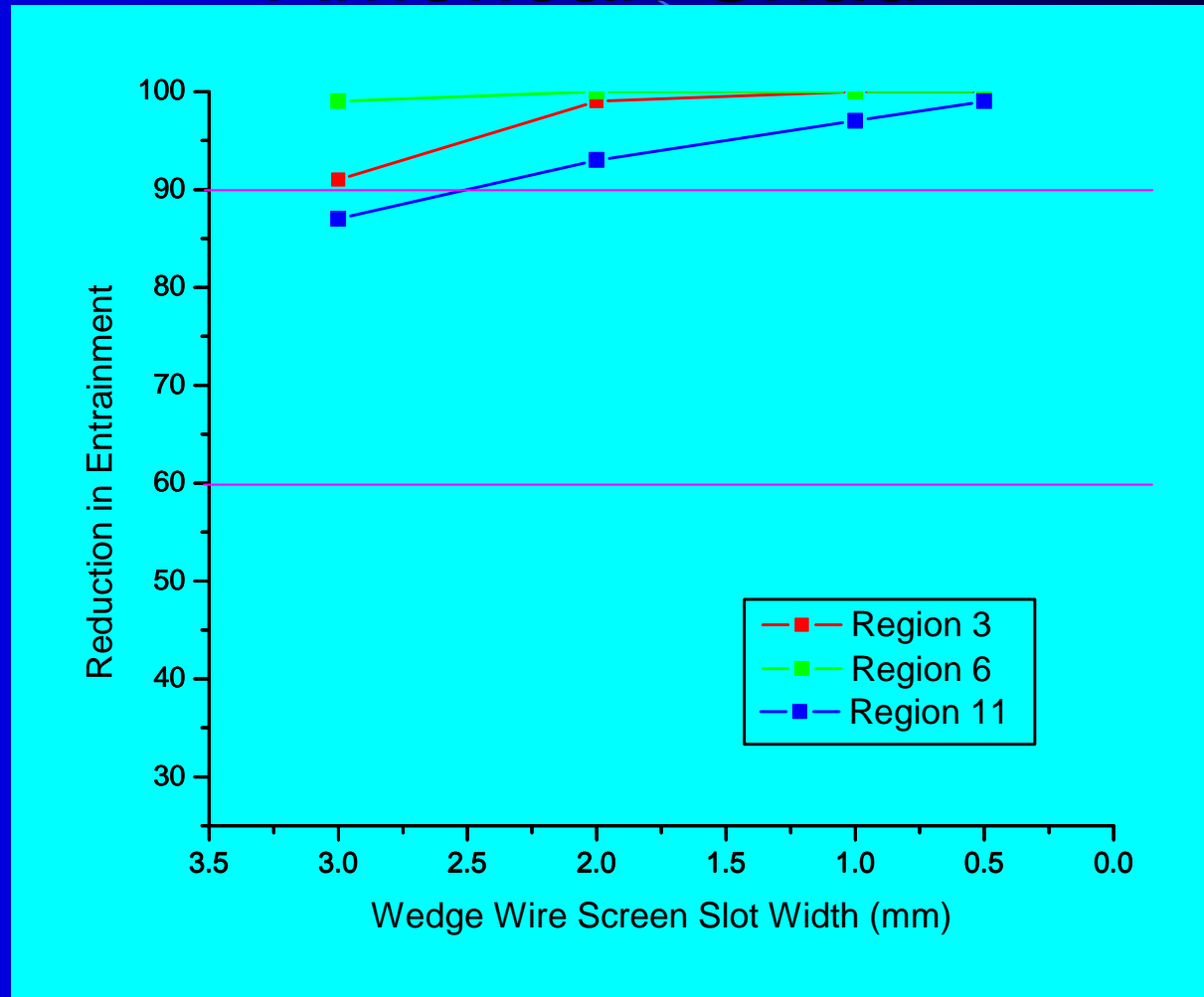
Equivalent Age 1 Base Case



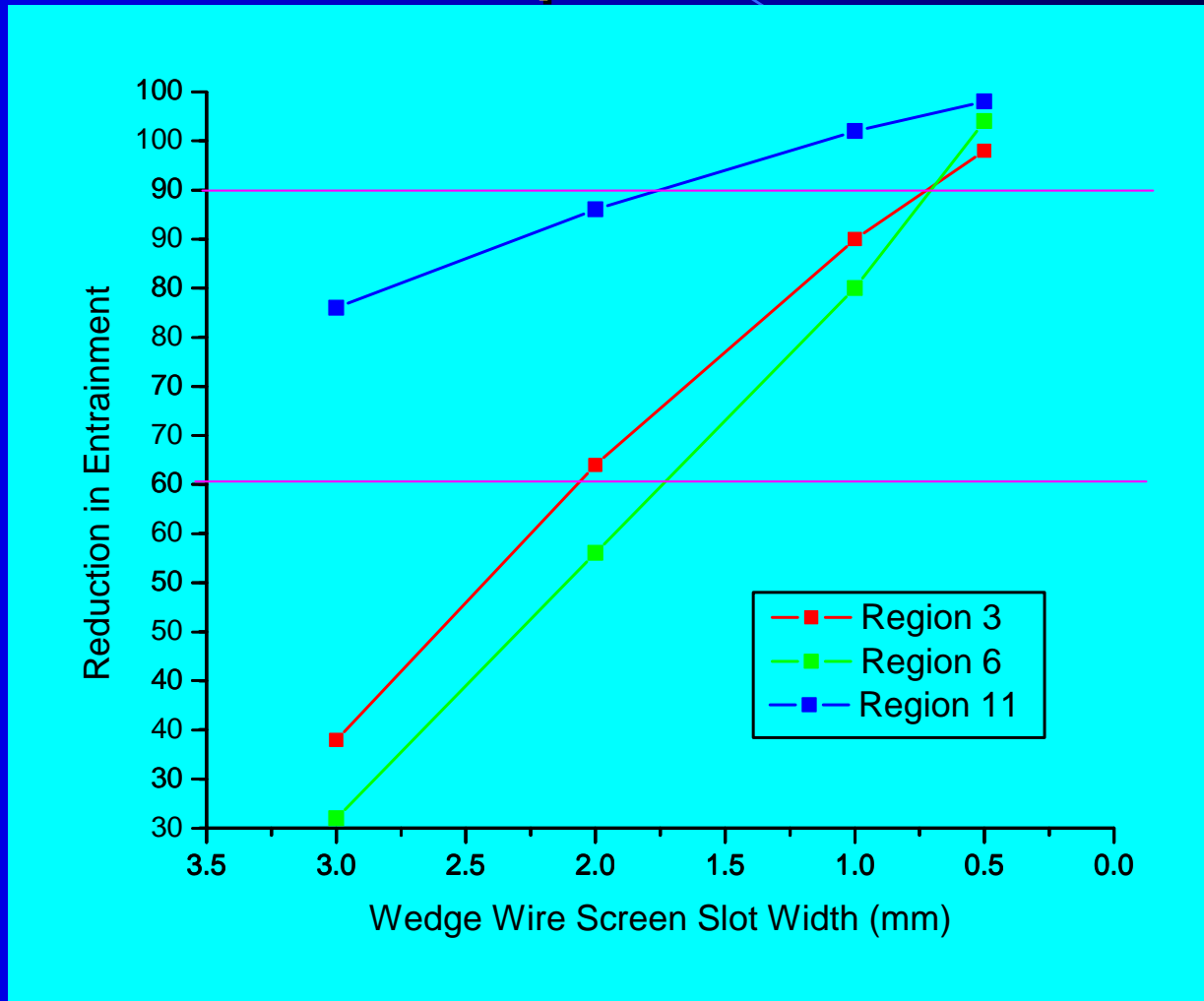
Assumed Screen Exclusion Rates



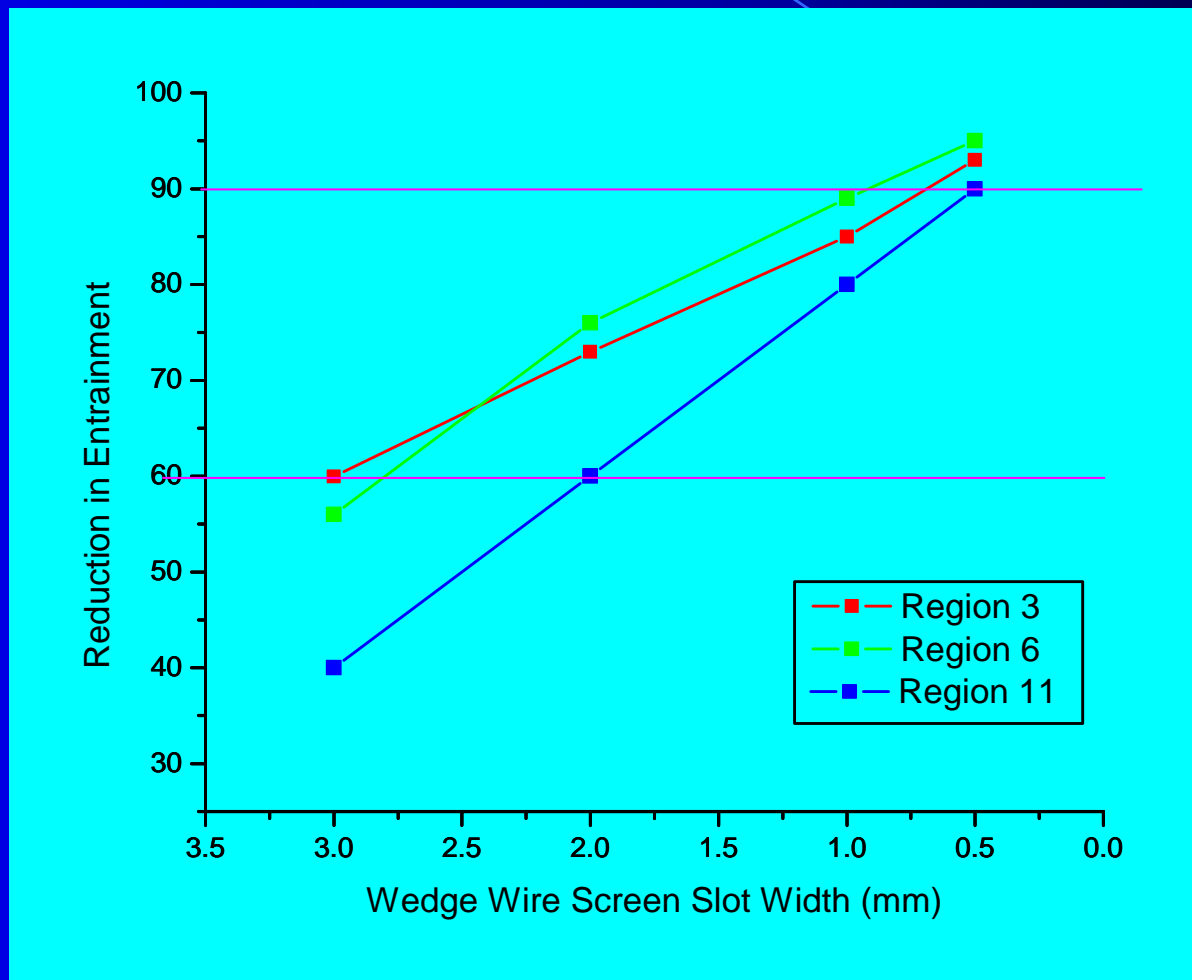
Entrainment Reductions American Shad



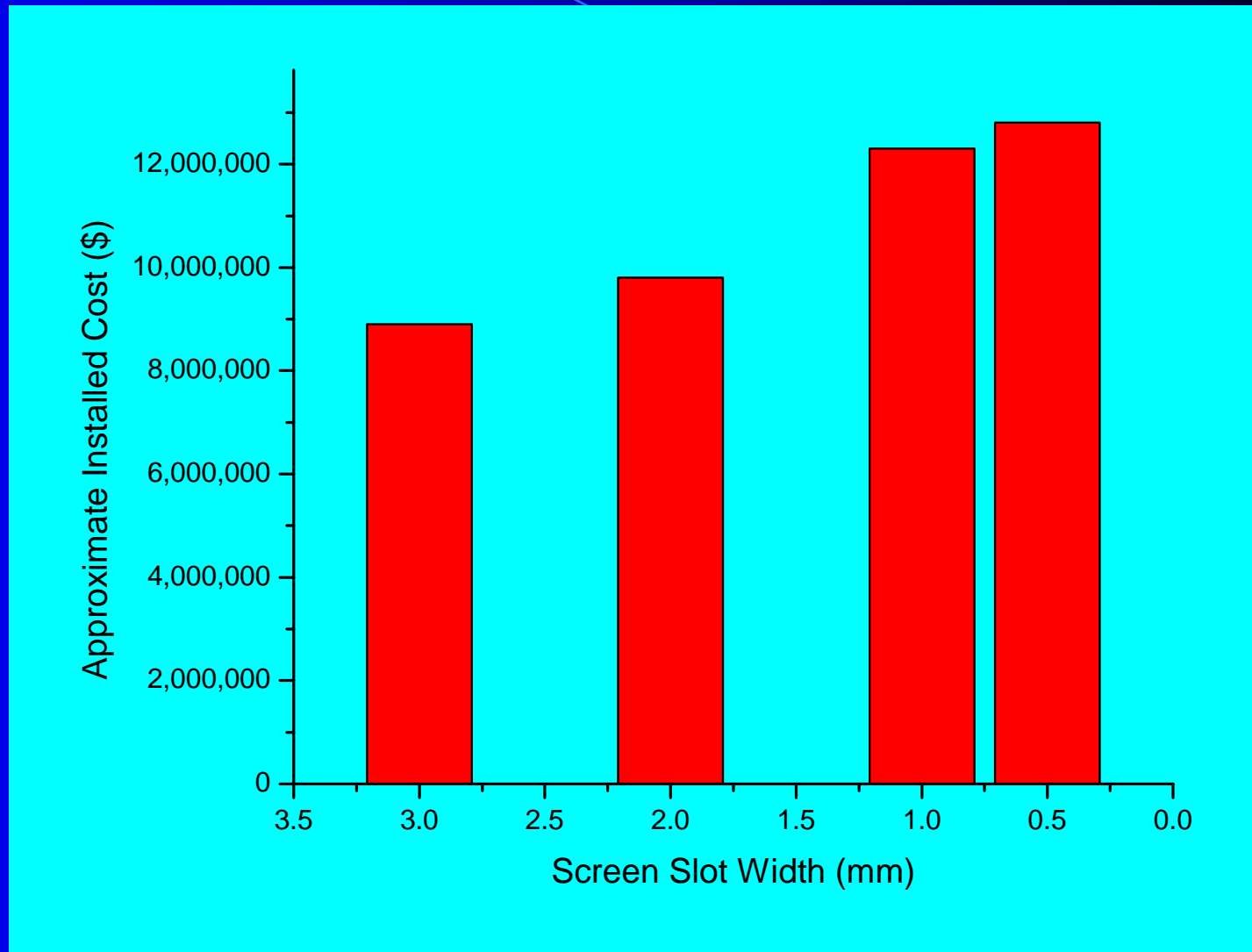
Entrainment Reductions Striped Bass



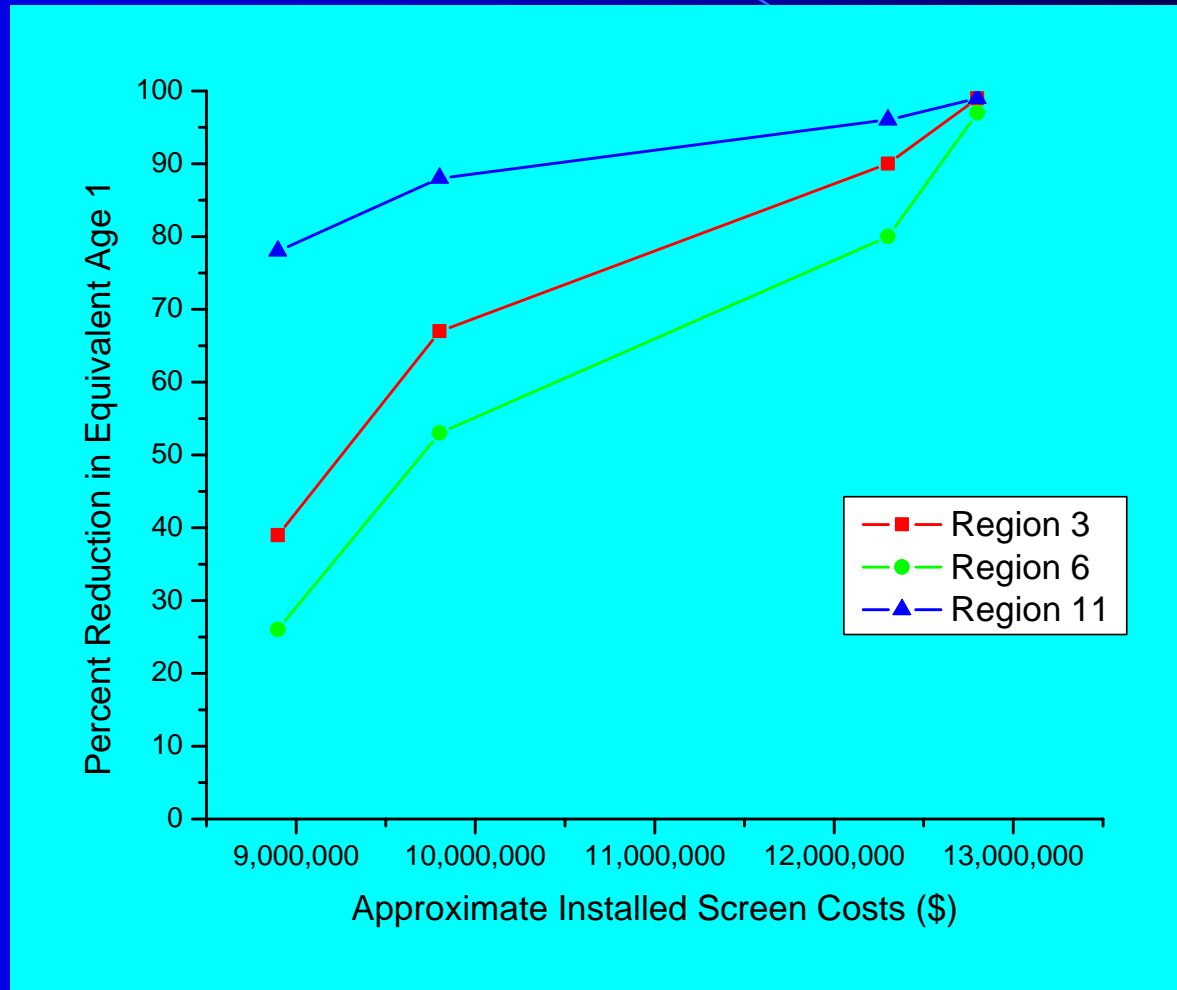
Entrainment Reductions Bay Anchovy



Screen Installation Costs



Example Cost-Benefit Curve



Conclusions

- Wedge wire screens appear to be highly effective in reducing entrainment losses
- Site-specific length information is required for optimal slot-width selection
- For American shad, 3 mm screens provide a high degree of protection
- For striped bass and bay anchovy, 2 mm screens provide significant protection.